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ANALYSIS AND COMPARATIVE HEATING VALUES OF NATURAL GAS AND COALS.

H. C. ALLEN.

IN VIEW of the recent publicity given the natural-gas question in this part of the country, the following data, prepared for the Public Utilities Commission of Kansas and used with their consent, is believed to be of considerable general interest. The coals given are typical of those sold in the territory supplied with natural gas, and the samples used were fairly representative, with the exception of the Leavenworth sample, which was rather more of a selected sample. The matter of efficiency, cleanliness, convenience, and all personal factors are not taken into account in the figures given, only the actual total number of heat units obtained being considered. The prices per ton given for the coals are those that prevailed in Lawrence at the time the tests were made.

Lawrence, city supply of natural gas.

Lab. No.	1238	1249	1250	1260	1261
Date, 1916	10-7	10-15	10-16	10-17	10-18
Analyses:					
Carbon dioxide	0.23%	0.77%	0.85%	0.51%	0.72%
Oxygen	0.00	0.45	0.45	0.55	0.17
Methane	85.80	88.44	89.95	91.24	92.50
Ethane	7.22	5.74	4.97	3.52	3.11
Residue	6.75	5.05	3.98	4.18	3.50
Total	100.00%	100.00%	100.00%	100.00%	100.00%

Heating value, calculated to 0° C. and 760 mm. pressure, B. t. u.

Gross	1.048	1.049	1.050	1.037	1.043
Net	953	954	954	948	948

Average gross heating value, corrected for humidity and to 60° F. and 30 in., 993 British thermal units (B. t. u.).

Coals.

Lab. No.	1251	1252	1253	1254
Kind of coal	Semi-anth.	Builingame	Briquette	Cherokee
Price per ton	\$7.50	\$5.00	\$7.50	\$5.00
Proximate analysis:				
Water	0.45%	7.67%	0.56%	1.81%
Volatile	18.07	39.62	21.21	36.11
Fixed Carbon	73.48	38.44	63.88	52.35
Ash	8.00	14.27	14.35	9.73
Total	100.00%	100.00%	100.00%	100.00%
Heating value per pound, B. t. u.	14,133	10,972	13,061	13,341
Comparative price of gas in cents per 1,000 cubic feet	26.35	22.58	28.51	18.61
Lab. No.	1255	1256	1257	1258
Kind of coal	Smithing	Smithing	Leavenworth	III. coal
Price per ton	\$9.00	\$10.00	\$4.75	\$6.00
Proximate analysis:				
Water	1.45%	0.58%	5.55%	7.76%
Volatile	15.25	22.42	39.15	43.60
Fixed carbon	75.36	70.08	48.11	43.00
Ash	7.94	6.92	6.79	5.64
Total	100.00%	100.00%	100.00%	100.00%
Heating value per pound, B. t. u.	13,560	14,339	12,718	12,375
Comparative price of gas in cents per 1,000 cubic feet	32.95	26.61	18.54	24.07